IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Raman Patel, et al.	Examiner:	Nathan M. Nutter
Serial No.:	10/754,045	Group Art Unit:	1711
Filed:	01/08/04	Date:	November 21, 2006
For:	**TOUGHENED POLYMER COMPOSITIONS**		

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The undersigned hereby certifies that the attached **APPEAL BRIEF UNDER 37 CFR §41.37 (ORIGINAL & TWO COPIES), CHECK NO. 17036 IN THE AMOUNT OF $500.00, AND EXHIBIT "A" - COPY OF AFFIDAVIT OF FACT UNDER 37 CFR §1.132 PREVIOUSLY SUBMITTED** were mailed to Mail Stop Appeal Brief-Patents, Commissioner for Patents, Alexandria, VA 22313-1450, with sufficient first-class postage, no special handling, on November 21, 2006 before 5:00 P.M., thereby ensuring that such documents will be in the hands of the U.S. Postal Service by the close of business this day.

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Respectfully submitted,

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- Exhibit "A"-Copy of Affidavit of Fact under 37 CFR §1.132 Previously Submitted (5 pgs.)

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BRIEF FOR APPELLANT

Sir:

Appellant has appealed the Final Rejection of May 31, 2006. Please consider this Appeal Brief filed in accordance with 37 CFR § 41.37.

REAL PARTY IN INTEREST

By virtue of an Assignment dated January 7 and January 8, 2004, by the named inventors, the real party in interest is Teknor Apex Company, having a business address of 505 Central Ave., Pawtucket, Rhode Island 02861-1900. The Assignment has been recorded in the U.S. Patent and Trademark Office on January 29, 2004 at Reel 014288 and Frame 0317.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to the Appellant which will affect or have bearing on the Board's decision concerning this appeal.

STATUS OF CLAIMS

Claims 1, 3-11 and 13-31 are pending in the application and have been rejected. Claims 1, 3-11 and 13-31 are being appealed.

STATUS OF AMENDMENTS

Appellant's claim amendments presented in Amendment "B" mailed April 10, 2006 have been entered by the Examiner. Appellant's Amendment "C" faxed July 31, 2006 did not present any claim amendments. There have been no additional amendments subsequent to the Final Rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to toughened polymer compositions including a specifically defined physical blend of a thermoplastic polymer component and a thermoplastic elastomer component, see page 2, lines 10-13. The thermoplastic elastomer component includes a rubber component dynamically vulcanized in the presence of a matrix polymer prior to blending with the thermoplastic polymer component, see page 2, lines 13-16. The toughened polymer composition is claimed in independent claim 21. A method for preparing a toughened polymer composition is claimed in independent claim 1. In a further embodiment, a method for forming rotationally molded articles with the toughened polymer compositions is claimed in independent claim 11. Unexpectedly, the toughened polymer compositions have greater impact resistance when compared to either a corresponding composition wherein the rubber component is uncured or the thermoplastic polyolefin polymer component alone, or both, see page 15, lines 18-26. The toughened compositions, as evidenced by increased impact resistance such as measured at -40°C according to ASTM D256, are obtained essentially without using plasticizers or large amounts of extender or rubber processing oil, see page 14, lines 11-23. Improved impact resistance was not expected in view of the compositions being substantially free of plasticizers and containing relatively low amounts of oil.

The thermoplastic elastomer component is formed by combining a rubber component, a matrix polymer component, crosslinking agent and optionally other components, and then dynamically vulcanizing the composition, see page 11, lines 14-18. Once dynamically vulcanized, the thermoplastic elastomer composition is blended with the thermoplastic polymer component, see page 13, lines 7-9. The thermoplastic polymer component is taught to be a polyolefin as set forth on page 3, lines 21-23. The

thermoplastic polyolefin polymer comprises at least 50% by weight of a homopolymer, see page 4, lines 8-10. The rubber component is present in an amount from about 2 to about 60 parts by weight per 100 parts by weight of the total matrix polymer and thermoplastic polyolefin polymer component, see page 14, lines 3-10.

In the prior art, generally high amounts of extender oil, such as greater than 30 parts by weight per 100 parts by weight rubber have been known to increase impact resistance of thermoplastic polymer containing compositions. The present invention does not rely on extender oil to increase impact resistance, but instead claims less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, see page 14, lines 11-17.

The toughened polymer composition optionally includes a compatibilizer, see page 13, lines 13-17.

The claimed toughened polymer composition has a greater impact resistance when compared to either a) the same, i.e., corresponding composition wherein the rubber component is uncured, or b) the thermoplastic polyolefin polymer component alone, or c) a combination of a) and b), see page 15, lines 18-26.

The toughened polymer composition is substantially free of plasticizer, see page 14, lines 18-19.

In addition to the recitations set forth hereinabove which are found in independent claims 1 and 21, independent claim 11 claims a method for producing rotationally molded articles utilizing a toughened polymer composition including many of the same limitations described above. Independent claim 11 includes the step of introducing a toughened polymer composition into a mold of a rotational molding device and rotationally molding at least the toughened polymer composition above a melting point of the composition thereby forming an article, see page 17, lines 15-27.

It is been unexpectedly found that the toughened polymer compositions of the present invention are particularly suitable for producing rotationally molded articles, see page 16, lines 15-17. The toughened polymer compositions when rotationally molded can produce parts having high surface quality with excellent hardness as well as impact strength, see page 16, lines 17-19. During rotational molding, polymeric compositions are subjected to relatively high temperatures for extended periods of time when

compared to other molding processes, such as injection molding. It is known to the art that uncured rubber containing compositions are not suitable for rotational molding as the rubber is not stable for extended periods of time at the rotational molding temperatures. It has been found that the vulcanized thermoplastic elastomer component of the toughened polymer blend having the defined particle size allows rotationally molded articles to be produced having excellent surface quality. Support for the claimed rotational molding aspects of the invention is set forth in the specification on page 16, line 15 through page 18, line 20.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

At issue is whether claims 1, 3-11 and 13-31 comply with the written description and enablement requirements under 35 U.S.C. § 112, first paragraph.

Further at issue is whether claims 1, 3-11 and 13-31 are indefinite under 35 U.S.C. § 112, second paragraph.

Additionally at issue is whether claims 1, 3-11 and 13-31 are patentable under 35 U.S.C. §103(a) over Coran (U.S. Patent No. 4,104,210) or Coran (U.S. Patent No. 4,141,878).

Finally at issue is whether claims 1-3, 5-7, 11-13, 15-17, 21 and 22 are patentable over Coran (U.S. Patent No. 4,130,535) under 35 U.S.C. §103(a).

ARGUMENT

Arguments Relating to 35 U.S.C. §112, First Paragraph Rejection Regarding Written Description Requirement

It is respectfully submitted that the Examiner has not presented a *prima facie* case of no written description. The application as filed provides adequate support for the claimed invention set forth in the currently pending claims. The C.C.P.A. has described by written description requirement as follows: "It is not necessary that the application describe the claim limitations exactly, . . . but only so clearly that persons of ordinary skill in the art will recognize from the disclosure that appellants invented processes include those limitations", see In re Wertheim, 541 F.2d 257, 191 USPQ 90, 96 (C.C.P.A. 1976). In Staehelin v. Secher, the Board added that "satisfaction of the

'written description' requirement does not require in haec verba antecedence in the originally filed application", see 24 USPQ2d 1513 (B.P.A.I. 1992). In Ex parte Parks, 30 USPQ2d 1234 (B.P.A.I. 1994), the Board further elaborated: "Adequate description under the first paragraph of 35 U.S.C. 112 does not require *literal* support for the claimed invention. . . . Rather, it is sufficient if the originally-filed disclosure would have conveyed to one having ordinary skill in the art that an appellant had possession of the concept of what is claimed."

The application as filed reasonably describes and conveys the concepts to one of ordinary skill in the art at the time of filing the patent application and shows that the inventors had possession of the claimed invention. The recitation in the claims regarding "wherein the toughened polymer composition has a greater impact resistance when compared to either a corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin polymer component alone, or a combination thereof" is clearly described in the specification on at least page 15, second full paragraph, as also indicated in Appellant's prior response. The claimed phrase "wherein the toughened polymer composition is substantially free of plasticizer" is set forth in the specification on page 14, second full paragraph. Likewise, the claim limitation involving rotationally molding at least the toughened polymer composition above a melting point of the composition is described on page 17, second full paragraph. The term "above the melting point of the toughened polymer composition" is specifically set forth on lines 25 and 26. Accordingly, it is respectfully submitted that a *prima facie* case of no written description has not been presented and the rejection is improper and should be withdrawn.

Arguments Relating to 35 U.S.C. §112, First Paragraph Regarding Enablement Requirement

Claims 1, 3-11 and 13-31 have been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Examiner further states that the claimed subject matter was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The Examiner states that the various

noted recitations are defined by reference to a desirable characteristic of property that would be present in identical compositions as inherent characteristics and further that it would require undue burden of experimentation to determine what the claims embrace.

It is also respectfully submitted that the Examiner has not presented a *prima facie* case of non-enablement. The Federal Circuit has outlined the general procedures that the Patent Office via the Examiner must implement for a proper determination of whether a patent application complies with the enablement requirements under Section 112, first paragraph. As stated by the Federal Circuit:

> "A specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented *must* be taken as in compliance with the enabling requirement of the first paragraph of §112 *unless* there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. . . . Any party making the assertion that a U.S. patent specification or claims fails, for one reason or another, to comply with §112 bears the burden of persuasion in showing said lack of compliance", see Fiers v. Sugano, 984 F.2d 1164, 25 USPQ2d 1601, 1607 (Fed. Cir. 1993).

The enablement requirement, however, does not require the Applicant to disclose the invention in a manner that can be understood by a child. Rather, for an application to be enabling, it must explain how to make and use the invention to one of ordinary skill in the art. Thus, specifications need only be reasonable with respect to the art involved, they need not inform the laymen nor disclose what the skilled already possess. A person of ordinary skill in the relevant art would be able to make and use the claimed invention. The limitation in independent claim 1, namely, "wherein the toughened polymer composition has a greater impact resistance when compared to either a corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin polymer component alone, or a combination thereof, and wherein the toughened polymer composition is substantially free of plasticizer" would be understood by one of ordinary skill in the art.

The Examiner states the noted limitation address the invention as being defined by reference to a desirable characteristic of property. The noted limitations include

functional and structural composition limitations. The test of enablement is not whether experimentation is necessary, but if experimentation is necessary, whether it is undue, see In re Angstadt, 537 F.2d 498, 190 USPQ 214, 219 (C.C.P.A. 1976).

The limitation wherein the composition is substantially free of plasticizer would not require undue experimentation to determine as a person of ordinary skill in the art typically engages in such experimentation to determine the components of a particular composition.

Likewise, the limitation wherein the toughened polymer composition has a greater impact resistance when compared to either the corresponding, i.e., same, composition wherein the rubber component has not been cured or the thermoplastic polyolefin polymer component of the composition alone would not require undue experimentation. Impact resistance measurements are typically conducted by those of ordinary skill in the art. Such experimentation is not undue. One is only required to measure the impact resistance of the claimed toughened polymer composition and compare the same to the impact resistance of the same composition without the rubber component being cured, as well as compare the impact resistance to the thermoplastic polyolefin polymer component that has been utilized in the toughened polymer composition.

The quantity of experimentation required is minimal as only the impact resistance of a few compositions must be determined. Moreover, the present application provides ample direction and guidance as set forth in the Example section as to how the experimentation can be conducted and even sets forth the test method, i.e., ASTM D256, a known standardized test method. The Examples presented in the specification illustrate that experimentation is not undue and are commonly undertaken in the art to measure physical properties common to polymeric compositions.

In the Advisory Action, the Examiner states that the language as recited in the claim appears in the specification but there is no further explanation or disclosure as to what is being claimed. The Examiner further states that the "Applicants have not shown what may be employed, only describing characteristics desired of such and allege that the Examiner has made no *prima facie* case of non-enablement" and that "Applicants should instead show where in the specification such enablement occurs, without

pointing out passages that are verbatim to the language in question". The Examiner further states that the same follows for the rejection made under 35 U.S.C. §112, second paragraph, as the metes and bounds of the claims are not clear to the Examiner.

In response to the Examiner's Advisory Action comments, the Appellant further describes the invention in addition to the specific language claimed which is also found in the specification as filed, as evidenced by the cited supporting passages.

Numerous approaches have been known in the past to improve the impact resistance of compositions including a majority of a polymer, such as in the case of the present invention, wherein the claimed toughened polymer composition of the independent claims includes at most 60 parts by weight of a rubber per 100 parts by weight of the matrix polymer and thermoplastic polyolefin polymer. Accordingly, 100 (parts polymer) divided by 160 (total parts rubber and polymer) equals at least 62.5% by weight of polymer (matrix + thermoplastic polyolefin) and less than or equal to 37.5% rubber is present based on a total weight of the rubber component, matrix polymer and thermoplastic polyolefin polymer components.

Approaches to produce toughened polymer compositions have included adding extender oil. Coran '535 acknowledges oil is utilized to extend vulcanizates in order to have improved strength. Generally high amounts of oil are needed in order to soften the composition to improve impact resistance, see Col. 2, lines 12-15. Coran '535 teaches 30 to 250 parts oil per 100 parts rubber, see Col. 6, lines 26-30. The claimed toughness of the present invention is not produced by the inclusion of large amounts of extender oil. The Appellant has claimed the toughened polymer composition containing less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component. Table I of the specification shows an example wherein processing oil is only utilized in amount of 10 parts per 100 parts by weight EPDM rubber. Thermoplastic Elastomer Composition 2 in Table III utilizes processing oil at the same ratio (10 phr) as set forth on page 24. Appellant utilizes relatively low amounts of oil to aid in processing, not to increase toughness via the claimed greater impact resistance.

Additionally, the toughened polymer composition is substantially free of plasticizer as claimed in independent claims 1 and 21. Plasticizers are also known to

those of ordinary skill in the art to soften compositions and, therefore, to increase impact resistance of compositions. Accordingly, as Appellant's toughened polymer compositions are substantially free of plasticizer, greater impact resistance is not due thereto. Appellant's example thermoplastic elastomer compositions 1 and 2, as set forth on pages 20 and 24, do not contain plasticizer as commonly known in the art.

As claimed in independent claims 1 and 21, the toughened polymer composition has a greater impact resistance than either a) a corresponding, i.e., same composition, with rubber component uncured, b) a thermoplastic polyolefin polymer component, i.e., polymer not mixed with thermoplastic elastomer, or c) greater impact resistance than both a) and b). Table I on page 20 illustrates Thermoplastic Elastomer Composition 1 which is cured by dynamic vulcanization by the inclusion of the peroxide crosslinking agent. Control 1 was not cured during melt blending as it lacked a crosslinking agent. As set forth in Table IA, last two rows, according to the Notched Izod Impact test performed at 23°C and -40°C according to ASTM D256, the toughened polymer composition including the cured or crosslinked rubber component had a higher impact resistance when compared to the control formulation wherein the rubber component was not cured. The thermoplastic polyolefin polymer component alone had a lower impact resistance than even the uncured rubber polymer composition.

Table IIIA also shows higher Notched Izod Impact resistance for a toughened polymer composition when compared to a corresponding control composition where the rubber component is uncured.

Arguments Relating to 35 U.S.C. §112, Second Paragraph Rejection

Claims 1, 3-11 and 13-31 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states that the limitation in claim 1 of "wherein the toughened polymer composition has a greater impact resistance when compared to either a corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin polymer component alone, or a combination thereof, and wherein the toughened polymer composition is substantially free of plasticizer" is not clear as to its proper metes and bounds. The

Examiner states that the product is defined as being compared to other products and the actual scope of the claims cannot be easily ascertained.

It is respectfully submitted that the Examiner has not presented a *prima facie* case of indefiniteness. Both the toughened polymer composition and the compositions to which the toughened polymer composition is compared, are clearly defined within the rejected claims and provide ample guidance as to what is being compared and what values must be attained by the claimed toughened polymer composition.

The limitation wherein the toughened polymer composition is substantially free of plasticizer is a structural limitation regarding the exclusion of a component from the composition. As noted hereinabove, the negative limitation is clearly set forth within the specification as originally filed. Moreover, as set forth in MPEP §2173.05(i), there is nothing inherently ambiguous or uncertain about a negative limitation. So long as the boundaries of the patent protection sought are set forth definitely, albeit negatively, the claim complies with the requirements of 35 U.S.C. §112, second paragraph.

The limitation "wherein the toughened polymer composition has greater impact resistance when compared to either a corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin polymer component alone, or a combination thereof", is a functional limitation regarding properties of the claimed invention. It is well established that functional limitations may be used in claims and that such limitations are not per se indefinite. A functional limitation in a claim is an attempt to define something by what it does, rather than by what it is. There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper or indefinite, see In re Swinehart, 439 F.2d 210, 169 USPQ 226, 229 (C.C.P.A. 1971). A functional limitation must be evaluated, just as any other limitation in a claim, for what the limitation reasonably conveys to a person of ordinary skill in the pertinent art in the appropriate context. The claimed functional limitation defines an important property or capability of the composition. The claims set forth definite boundaries on which patent protection is sought. The independent claims of the present invention define that the claimed toughened polymer composition has greater impact resistance than either (a) the same, corresponding composition with rubber component uncured, or (b) the thermoplastic

polyolefin polymer component of the toughened polymer composition. It is respectfully submitted that the language provides a clear indication of the scope of the subject matter sought to be patented.

Arguments Relating to 35 U.S.C. §103(a) Rejections in View of Coran (U.S. Patent 4,104,210) or Coran (U.S. Patent No. 4,141,878) or Coran (U.S. Patent No. 4,130,535

Arguments Relating to Claims 1 and 21

As a preface to the Appellant's arguments relating to the 35 U.S.C. §103 rejections, it is pointed out Raman Patel, one of the co-inventors of the present application at issue, is also a co-inventor of all three of the cited references presented by the Examiner in making his 35 U.S.C. §103(a) rejections. As an actual co-inventor of the cited references, Dr. Patel clearly has the ability to set forth the position as to the teachings and suggestions presented by the references. As such, the Appellant has submitted an Affidavit under 37 CFR §1.132 on April 13, 2006 that is directed to the 35 U.S.C. §103(a) obviousness-type rejections presented by the Examiner, wherein the Affidavit is authored by co-inventor Dr. Patel. The Affidavit sets forth, from the perspective of Dr. Patel, a co-inventor of each of the cited references, what the cited references teach as a whole and states that it would not be obvious to one of ordinary skill in the art to arrive at Appellant's claimed compositions for at least the reasons stated therein. Consideration of the Affidavit in conjunction with this Appeal Brief is earnestly solicited.

It is respectfully submitted that the cited Coran references cannot teach or suggest the present invention as claimed and the Examiner has not presented a *prima facie* case of obviousness with respect to independent claims 1 and 21, or the claims dependent therefrom. There is no recognition in the prior art references of the problem encountered in the present invention which involved the need for toughened polymer compositions which exhibit improved impact resistance, while being processable in equipment such as rotational molding devices, wherein the solution is provided by Appellant's claimed thermoplastic compositions comprising a polyolefin component which is toughened by the inclusion of a thermoplastic elastomer component, wherein

the toughened polymer compositions include the specifically claimed features and negative limitations. There is no suggestion to modify the Coran references and when each are considered as a whole, the same teach away from the claimed present invention.

The *prima facie* case requires that the references generally place the needed subject matter supporting the obviousness rejection in the public domain before the date of invention. The prior art reference must describe and enable the claimed invention with sufficient clarity and detail to establish that the subject matter already existed in the prior art and that its existence was recognized by persons of ordinary skill in the field of the invention, see Elan Pharms. Inc. v. Mayo Found. for Med. Educ. & Research, 304 F.3d 1221, 64 USPQ2d 1292, 1296 (Fed. Cir. 2002), *opinion vacated on other grounds,* 314 F.3d 1299 (Fed. Cir. 2002), *on rehearing en banc reversed on other grounds,* 346 F.3d 1051, 68 USPQ2d 1373 (Fed. Cir. 2003) (en banc).

A *prima facie* case also requires some reason, suggestion, or motivation from the prior art as a whole for the person of ordinary skill in the art to have combined or modified the references. The Federal Circuit has stated that "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination", see In re Geiger, 815 F.2d 686, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987). Coupled with this provision is the additional requirement that the suggestion or motivation exist before the date of invention as set forth in 35 U.S.C. §103(a). Thus, it is incorrect for the Examiner to formulate the suggestion or motivation based on current knowledge; and the Examiner must remove all knowledge that he has accumulated since the date of invention. As stated by the Federal Circuit:

> "It is impermissible to use the claimed invention as an instruction manual or 'template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention", see In re Fritch, 972 F.2d 1260, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992).

A factor cutting against a finding of motivation to combine or modify the prior art is when the prior art teaches away from the claimed combination. A reference may be

said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that the applicant took, see In re Gurley, 25 F.3d 551, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994).

The Federal Circuit has also stated "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention", see W. L. Gore & Associates v. Garlock, Inc., 7821 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

In In re Wesslau, the Court of Customs and Patent Appeals cautioned that "it is impermissible within ... to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art", see 353 F.2d at 241, 147 USPQ at 393.

In Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 442, 230 USPQ 416 (Fed. Cir. 1986), cert. denied, 484 U.S. 823 (1987), on remand, 10 USPQ2d 1929 (N.D. Calif. 1989), the Federal Circuit held that a single line in a prior art reference should not be taken out of context and relied upon with the benefit of hindsight to show obviousness. Rather, a reference should be considered as a whole, and portions arguing against or teaching away from the claimed invention must be considered.

Each Coran reference as a whole, teaches thermoplastic elastomers, with the Coran '210 reference teaching thermoplastic elastomer comprising a blend of high unsaturation diene rubber and thermoplastic olefin resin, see Abstract. The Coran '535 reference teaches thermoplastic vulcanizates comprising blends of olefin rubber and thermoplastic olefin resin, see Abstract, and the Coran '878 reference teaches thermoplastic compositions of cross-linked CSM rubber and thermoplastic crystalline polyolefin resin, see Abstract.

The Examiner states the references teach broadly the employment of a thermoplastic elastomer blend composition with other thermoplastic polyolefin resins.

It is impermissible for the Examiner to utilize hindsight reconstruction to pick and choose only certain disclosures of the Coran reference and state that the claimed present invention is obvious in view thereof. The Coran '210 reference teaches in Col.

1, lines 40-50, that "it has been found that blends which comprise about 25-45 parts by weight of polyolefin resin and about 75-55 parts by weight of vulcanized high unsaturation diene rubber can be prepared which are both elastomeric and thermoplastic and further characterized by improved toughness as compared to similar compositions with lower or high proportions of rubber." Col. 1, lines 60-63, states that "When the quantity of rubber falls below about 55 parts by weight per 100 parts by weight resin and rubber combined, hard, rigid compositions having reduced toughness are obtained" (emphasis added). As described hereinabove, independent claims 1 and 21 include at most 60 parts by weight of rubber per 100 parts by weight matrix polymer and thermoplastic polyolefin polymer, i.e., at most 37.5 parts of rubber per 100 parts by weight resin and rubber combined as defined by the basis in the Coran '210 reference. Unexpectedly, the inventors have discovered that increased toughness can be obtained utilizing Appellant's specifically claimed composition which contains relatively low amounts of rubber taught by the Coran '210 reference to have reduced toughness. The Examiner has stated that the 55 parts is only relevant with respect to the thermoplastic elastomer component. However, as indicated in the Affidavit under 37 CFR §1.132, co-inventor Raman Patel of the cited '210 reference, states that the teachings in Col. 1 are relevant whether the polyolefin resin is a matrix polymer and/or a thermoplastic polymer component of the thermoplastic elastomer.

Moreover, as set forth in Col. 6, lines 33-47 of Coran '210, it is stated that the thermoplastic compositions may be modified either before or after vulcanization, by addition of ingredients including plasticizers, see line 42, and extender oil, see line 47. As it is known to those of ordinary skill in the art that plasticizers and extender oil are known to increase impact resistance, it would not be obvious to one of ordinary skill in the art, in addition to limiting the upper range of rubber in the toughened polymer composition as claimed in independent claims 1 and 21, to further limit a composition to contain less than 20 parts by weight of extender oil per 100 parts by weight of rubber, and also to limit the composition to be substantially free of plasticizer as specifically claimed in view of Coran '210.

Regarding the Coran '535 reference, Col. 2, lines 12-15, describe that it is a feature of the invention that oil extended vulcanizates can be prepared having improved

strength. Column 6, lines 26-30, state that commonly about 30 to 250 parts by weight of extender oil are added per 100 parts by weight of rubber present in the blend with quantities of about 70 to 200 parts by weight of extender oil per 100 parts by weight of rubber being preferred. As stated in the Affidavit of record, Dr. Patel states that the claimed less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component would not be expected by one of ordinary skill in the art to produce toughened polymer compositions, as one of ordinary skill in the art believes that adding more oil would soften the composition and thereby improve impact resistance. Moreover, Col. 12, lines 60-65, states that the addition of extender oil ordinarily reduces hardness, and thus would improve impact resistance. It is further stated that in blends containing high proportions of resin, sufficient extender oil must be used so that an adequate combined quantity of rubber and extender oil be present in order to obtain thermoplastic elastomeric vulcanizates.

Column 5, line 67 through Column 6, line 10 of the Coran '535 states that the properties of the thermoplastic vulcanizates can be modified by addition of ingredients including a plasticizer. As indicated hereinabove, plasticizers are known to soften compositions and thereby improve the processing thereof, and also increase impact resistance. There is no teaching or suggestion to provide Appellant's claimed compositions which are substantially free of plasticizer.

The Coran '878 reference teaches compositions comprising blends of thermoplastic crystalline polyolefin resin and cross-linked CSM (chlorosulfonated polyethylene) rubber and generically states that "properties vary depending on the proportion of crystalline polyolefin resin and cross-linked CSM rubber in the composition", see Col. 1, lines 28-33. Column 2, lines 32-38, states that "when the quantity of cross-linked CSM rubber, in the absence of plasticizer, falls below about 50 parts by weight per 100 parts total weight of polyolefin resin and CSM rubber, or when the quantity of polyolefin resin exceeds 50 weight percent of the composition, hard, rigid compositions having reduced toughness are obtained". As such, the Coran '878 reference teaches away from utilizing less than 50 parts by weight of CSM rubber per 100 total parts by weight of polyolefin and CSM rubber for producing a composition having increased toughness. As described above, Appellant's independent claims at

most utilize 37.5 parts by weight of rubber per 100 parts by weight of polymer and rubber, well below the Coran teachings of the needed 50 parts by weight rubber to produce a composition having increased toughness. The cited passage also indicates that plasticizer must be utilized in order to increase toughness if lower parts by weight of rubber are utilized.

A person of ordinary skill, upon reading the Coran references, would be led in a direction divergent from the path that the Applicants took to arrive at the specifically claimed toughened thermoplastic composition. It is impermissible to pick and choose from any of the cited Coran references only so much of them as will support the Examiner's position, to the exclusion of other parts necessary to the full appreciation of what the references fairly suggest to one of ordinary skill in the art.

Contrary to the Examiner's repeated statements in the Office Action, Applicants' arguments and the Affidavit under 37 CFR §1.132 submitted April 13, 2006 is directed to the 35 USC §103 obviousness type rejections. The Affidavit sets forth, from the perspective of one of the actual inventors of each of the cited references, what the cited references teach as a whole and states that it would not be obvious to one of ordinary skill in the art to arrive at Applicants' claimed toughened compositions.

In summary, the prior art Coran references do not describe and enable the claimed composition with sufficient clarity and detail to establish that the subject matter already existed in the prior art and that its existence was recognized by persons of ordinary skill in the field of the invention. There is no reason, suggestion or motivation from the prior art as a whole for the person of ordinary skill in the art to modify the references in the manner suggested by the Examiner to provide a rubber component in an amount from about 2 to about 60 parts by weight per 100 parts by weight of the matrix polymer and thermoplastic polyolefin polymer (or stated otherwise, in an amount to about 37.5 parts by weight per 100 parts by weight of the matrix polymer, thermoplastic polyolefin polymer component and rubber component), limiting the toughened polymer composition to less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component and also limiting the toughened polymer composition to be substantially free of plasticizer.

The genius of invention is often a combination of known elements which, in hindsight, seems preordained. Nothing in the references alone suggests the claimed invention as a solution to the problem of providing a toughened thermoplastic composition without using relatively high amounts of plasticizer and extender oil. As indicated above, the Coran '210 and '878 references teach that when low amounts of rubber are utilized, such as less than about 55 parts by weight per 100 parts by weight of resin and rubber as set forth in the Coran '210 reference and less than about 50 parts by weight per 100 parts by weight of polyolefin resin and CSM rubber as set forth in the Coran '878 reference, hard, rigid compositions having reduced toughness are expected to be obtained, with the rates of inclusion for the respective thermoplastic resin are relevant whether the polyolefin resin in a matrix polymer and/or a thermoplastic polymer component, as set forth in the Affidavit.

Arguments Relating to Claim 3 and 22

The Coran '878 reference relates to compositions including cross-linked chloro-sulfonated polyethylene rubber and cannot teach or suggest the rubber component defined specifically in claim 3, see Col. 1, lines 28-33.

Arguments Relating to Claims 5 and 24

The Coran '210 reference teaches the use of high unsaturation rubber to form thermoplastic elastomers, see Col. 5, lines 13-32. The Coran '210 reference cannot teach or suggest the claimed ethylene propylene rubber, EPDM rubber, or a combination thereof. Moreover, as indicated above with respect to independent claims 1 and 21, the Coran '210 and '535 references teach away from toughened polymer compositions containing less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component and wherein the toughened polymer composition is substantially free of plasticizer. The Coran '210 and '535 references also cannot teach the claimed limitation wherein the toughened polymer composition has a greater impact resistance when compared to either corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin component alone, or a

combination thereof, and wherein the toughened polymer composition is substantially free of plasticizer.

Likewise, the Coran '878 reference teaches the use of chlorosulfonated polyethylene rubber, see Abstract. Accordingly, the Coran '878 reference teaches away from the limitations set forth in claims 5 and 24 which claims rubber component is ethylene propylene rubber, EPDM rubber, or a combination thereof. Moreover, as indicated hereinabove, the Coran '878 reference cannot teach or suggest toughened polymer compositions containing less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component and wherein the toughened polymer composition is substantially free of plasticizer. As such, the Coran '210 reference also cannot teach the claimed limitation wherein the toughened polymer composition has a greater impact resistance when compared to either corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin component alone, or a combination thereof, and wherein the toughened polymer composition is substantially free of plasticizer.

Arguments Relating to Claims 6 and 25

Claim 6 is dependent upon claim 5, claim 25 is dependent on claim 24, and therefore the above arguments relating to claims 5 and 24 are incorporated herein by reference. Moreover, claims 6 and 25 limit the rubber component to being present in an amount from about 5 to about 50 parts by weight per 100 parts by weight of the matrix polymer and thermoplastic polymer component. Stated in another manner, the rubber component is present in an amount from about 4.8 parts (5 divided by 105) to about 33 parts (50 divided by 150) by weight per 100 parts total matrix polymer, thermoplastic polymer and rubber. As described hereinabove with respect to independent claims 1 and 21, the cited references teach away from providing such low amounts of rubber and still being able to produce a composition having improved toughness. As claim 6 is ultimately dependent on claim 1, claim 25 is ultimately dependent on claim 21, the limitations of the low amounts of extender oil and the composition being substantially free of plasticizer are also included and cannot be taught or suggested by the references.

see page 17, line 27. Periods of time can range from about 8 minutes to about 25 minutes, see page 18, lines 6-7. In contrast, other types of molding such as injection molding are generally performed at lower temperatures and for much shorter periods of time and, therefore, rubber stability is not much of an issue.

Moreover, none of the cited references teach or suggest rotationally molding a thermoplastic vulcanizate, much less a toughened polymer composition. The Coran '210 reference teaches compression molding in Col. 3, line 67, and extrusion and injection molding in Col. 4, lines 4-5. Accordingly, the Coran '210 reference does not teach or suggest rotational molding. Regarding the Coran '535 reference, it teaches making articles by extrusion, injection molding and compression molding techniques, see Col. 6, lines 44-46. The Coran '878 reference teaches that articles may be formed from thermoplastic elastomers by extrusion, injection molding, or compression molding, see Col. 1, lines 17-19, as well as Col. 6, lines 28-40.

The Affidavit presented by Dr. Patel further describes the teachings of the Coran '210, 535 and '878 references. Dr. Patel states that it is known to the art that cured and uncured rubber containing compositions are not suitable for producing rotational molded articles as the rubber is not stable during the extended period of molding time utilized in producing rotational molded articles. Further, uniform melt flow during rotational molding is a problem when utilizing uncrosslinked rubber blends because of viscosity issues. Dr. Patel further states that it has been unexpectedly found that the toughened polymer compositions unexpectedly produce, according to the rotational molding method of the present invention, parts having high surface quality with excellent hardness and impact strength.

Accordingly, it is respectfully submitted that the cited references cannot teach or suggest producing rotationally molded articles via the claimed process. Moreover, as indicated hereinabove, the cited references cannot teach or suggest, absent impermissible hindsight, toughened polymer compositions utilized in the claimed process as defined in claim 11.

Arguments Relating to Claim 14

Dependent claim 14 claims the composition is molded at a temperature from about 260°C to about 371°C. The Coran '210 reference teaches that the thermoplastic vulcanizate can be compression molded at 200°C to 250°C as set forth in Col. 7, lines 43-46. Every example teaches molding at a temperature of 225°C or less. Thus, the Coran '210 reference cannot teach or suggest the limitations set forth in claim 14.

Likewise, the Coran '535 reference teaches compression molding at 220°C, see Col. 7, lines 11-14; see also Col. 12, lines 1-2. Thus, the Coran '535 reference teaches away from the claimed limitation.

Similarly, the Coran '878 reference teaches in Col. 7, lines 9-12, compression molding at 200°C to 220°C. Accordingly, the reference also teaches away from the claimed limitation set forth in dependent claim 14.

Arguments Relating to Claim 15

In addition to lacking any teaching regarding rotationally molding a toughened polymer composition, the Coran '210 reference teaches the use of high unsaturation rubber to form thermoplastic elastomers, see Col. 5, lines 13-32. The Coran '210 reference cannot teach or suggest the claimed ethylene propylene rubber, EPDM rubber, or a combination thereof. Moreover, as indicated above with respect to independent claims 1 and 21, the Coran '210 and '535 references teach away from toughened polymer compositions containing less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component.

Likewise, the Coran '878 reference teaches the use of chlorosulfonated polyethylene rubber, see Abstract. Accordingly, the Coran '878 reference teaches away from the limitations set forth in claim 5 which claims rubber component is ethylene propylene rubber, EPDM rubber, or a combination thereof. Moreover, as indicated hereinabove, the Coran '878 reference cannot teach or suggest toughened polymer compositions containing less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component.

Dependent claim 14 claims the composition is molded at a temperature from about 260°C to about 371°C. The Coran '210 reference teaches that the thermoplastic vulcanizate can be compression molded at 200°C to 250°C as set forth in Col. 7, lines 43-46. Every example teaches molding at a temperature of 225°C or less. Thus, the Coran '210 reference cannot teach or suggest the limitations set forth in claim 14.

Likewise, the Coran '535 reference teaches compression molding at 220°C, see Col. 7, lines 11-14; see also Col. 12, lines 1-2. Thus, the Coran '535 reference teaches away from the claimed limitation.

Similarly, the Coran '878 reference teaches in Col. 7, lines 9-12, compression molding at 200°C to 220°C. Accordingly, the reference also teaches away from the claimed limitation set forth in dependent claim 14.

Arguments Relating to Claim 15

In addition to lacking any teaching regarding rotationally molding a toughened polymer composition, the Coran '210 reference teaches the use of high unsaturation rubber to form thermoplastic elastomers, see Col. 5, lines 13-32. The Coran '210 reference cannot teach or suggest the claimed ethylene propylene rubber, EPDM rubber, or a combination thereof. Moreover, as indicated above with respect to independent claims 1 and 21, the Coran '210 and '535 references teach away from toughened polymer compositions containing less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component.

Likewise, the Coran '878 reference teaches the use of chlorosulfonated polyethylene rubber, see Abstract. Accordingly, the Coran '878 reference teaches away from the limitations set forth in claim 5 which claims rubber component is ethylene propylene rubber, EPDM rubber, or a combination thereof. Moreover, as indicated hereinabove, the Coran '878 reference cannot teach or suggest toughened polymer compositions containing less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component.

Arguments Relating to Claim 16

Claim 16 is dependent upon claim 5 and therefore the above arguments relating to claim 15 are incorporated herein by reference. Moreover, claim 16 limits the rubber component to being present in an amount from about 5 to about 50 parts by weight per 100 parts by weight of the matrix polymer and thermoplastic polymer component. Stated in another manner, the rubber component is present in an amount from about 4.8 parts (5 divided by 105) to about 33 parts (50 divided by 150) by weight per 100 parts total matrix polymer, thermoplastic polymer and rubber. As described hereinabove with respect to independent claims 1 and 21, the cited references teach away from providing such low amounts of rubber and still being able to produce a composition having improved toughness. As claim 16 is ultimately dependent on claim 11, the limitation of the low amount of extender oil cannot be taught or suggested by the references.

Arguments Relating to Claim 17

Claim 17 include narrow restrictions regarding the rubber component present in an amount from about 10 to about 45 parts by weight per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin polymer component. As indicated hereinabove with respect to independent claim 11, the cited references teach away from such low amounts of rubber combined with the lower amounts of extender oil and the composition being substantially free of plasticizer, while providing the composition with improved impact resistance as claimed.

Arguments Relating to Claim 20

Claim 20 includes further narrower restrictions regarding the composition content of oil which is less than 15 parts per 100 parts by weight of rubber. The rubber component is further limited to an amount from 18 to about 42 parts by weight per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin. Translated into a 100 parts by weight basis of rubber, matrix polymer and thermoplastic polymer, the composition includes only up to about 29.5 parts by weight of rubber.

Summary

The Appellant respectfully argues that the cited references cannot teach or suggest the present invention as claimed and the Examiner has not presented a *prima facie* case of obviousness. Only hindsight motivation can be utilized to modify the cited references to arrive at Appellant's claimed toughened polymer compositions and processes for preparing the same, including the claimed relatively low parts by weight of the rubber component, relatively low parts by weight of extender oil, and the composition being substantially free of plasticizer.

Moreover, the cited references do not provide any teaching or suggestion for providing a process for rotational molding including the claimed toughened polymer composition, especially wherein the compositions are molded at temperatures above the temperature ranges taught by the Coran references. The Affidavit by co-inventor Dr. Patel characterizes the teachings of the cited Coran references, of which he is a co-inventor, and explains the differences between the present invention and the cited references as claimed. Consideration of this Appeal Brief is greatly appreciated.

Claims Appendix

1. (Previously Presented) A process for preparing a toughened polymer composition, comprising the steps of:

combining a rubber component and a matrix polymer, said matrix polymer being a polyolefin;

crosslinking the rubber component in the presence of the matrix polymer with a crosslinking agent at a temperature above the melting point of the matrix polymer to form a thermoplastic elastomer component; and

blending the thermoplastic elastomer component with a thermoplastic polyolefin polymer component to form the toughened polymer composition, said thermoplastic polyolefin polymer comprising at least 50% by weight of a homopolymer, wherein the rubber component is present in an amount from about 2 to about 60 parts by weight per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin polymer component, wherein the toughened polymer composition contains less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, wherein the toughened polymer composition optionally includes a compatibilizer, wherein the toughened polymer composition has a greater impact resistance when compared to either a corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin polymer component alone, or a combination thereof, and wherein the toughened polymer composition is substantially free of plasticizer.

2. (Canceled)

3. (Previously Presented) A process according to claim 1, wherein the thermoplastic polyolefin polymer component is derived from at least one olefin monomer having from 2 to about 14 carbon atoms, wherein the matrix polymer of the thermoplastic elastomer component is derived from at least one olefin monomer having from 2 to 14 carbon atoms, and wherein the rubber component of the thermoplastic elastomer component is derived from at least two different alpha olefin monomers, or is styrene butadiene rubber, hydrogenated styrene butadiene rubber, butyl rubber, butyl-paramethyl styrene copolymer or derivatives thereof, styrenic block copolymer, acrylic

rubber, nitrile rubber, hydrogenated nitrile rubber, or ethylene methacrylate terpolymer rubber, or any combination thereof.

4. (Previously Presented) A process according to claim 3, wherein the crosslinked rubber component of the thermoplastic elastomer component has an average particle size of about 0.005 to about 25 microns, and wherein the thermoplastic elastomer component and thermoplastic polyolefin polymer component are melt blended.

5. (Previously Presented) A process according to claim 1, wherein said thermoplastic polyolefin polymer component is derived from ethylene, propylene, butene, pentene, hexene, heptene, 2-methyl-1-propene, 3-methyl-1-pentene, 4-methyl-1-pentene, or 5-methyl-1-hexene, or a combination thereof, and wherein said rubber component of the thermoplastic elastomer component is ethylene propylene rubber, EPDM rubber, or a combination thereof.

6. (Previously Presented) A process according to claim 5, wherein the rubber component of the thermoplastic elastomer component is present in an amount from about 40 to about 90 parts by weight per 100 parts by weight of the rubber component and the matrix polymer of the thermoplastic elastomer component, and wherein the rubber component is present in an amount from about 5 to about 50 parts by weight per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin polymer component.

7. (Previously Presented) A process according to claim 1, wherein the rubber component of the thermoplastic elastomer component is present in an amount from about 10 to about 45 parts by weight per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin polymer component.

8. (Previously Presented) A process according to claim 7, wherein the crosslinked rubber component of the thermoplastic elastomer component has an average particle size of from about 0.1 to about 10 microns, wherein the rubber

component of the thermoplastic elastomer component is crosslinked at a temperature of at least 10°C higher than the melt temperature of the matrix polymer of the thermoplastic elastomer component, and wherein blending of the thermoplastic elastomer component and the thermoplastic polyolefin polymer component is conducted at a temperature greater than 10°C above the melting point of the thermoplastic polyolefin polymer component.

9. (Previously Presented) A process according to claim 8, wherein the thermoplastic polyolefin polymer component is polyethylene or polypropylene or a combination thereof, and wherein the matrix polymer of the thermoplastic elastomer component is derived from ethylene, propylene, or 4-methyl-1-pentene, or a combination thereof.

10. (Previously Presented) A process according to claim 9, wherein the toughened polymer composition contains less than 15 parts of oil, based on 100 parts by weight of the rubber component of the thermoplastic elastomer component, and wherein the rubber component of the thermoplastic elastomer component is present in an amount from 18 to about 42 parts by weight per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin polymer component.

11. (Previously Presented) A method for producing rotationally molded articles having toughness, comprising the steps of:

introducing a toughened polymer composition into a mold of a rotational molding device, said toughened polymer composition comprising a thermoplastic polyolefin component and a thermoplastic elastomer component comprising a matrix polymer and a crosslinked rubber component, said matrix polymer being a polyolefin, said thermoplastic polyolefin component comprising at least 50% by weight of a homopolymer, wherein the rubber component is present in an amount from about 2 to about 60 parts by weight per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin component, wherein the toughened polymer composition contains less than 20 parts by weight of extender oil per 100 parts by weight of the

rubber component, and wherein the toughened polymer composition optionally includes a compatibilizer; and

rotationally molding at least the toughened polymer composition above a melting point of the composition thereby forming an article.

12. (Canceled)

13. (Previously Presented) A method according to claim 11, wherein the thermoplastic polyolefin component is derived from at least one olefin monomer having from 2 to about 14 carbon atoms, wherein the matrix polymer of the thermoplastic elastomer component is derived from at least one olefin monomer having from 2 to 14 carbon atoms, and wherein the rubber component of the thermoplastic elastomer component is derived from at least two different alpha olefin monomers, or is styrene butadiene rubber, hydrogenated styrene butadiene rubber, butyl rubber, butyl-paramethyl styrene copolymer or derivatives thereof, styrenic block copolymer, acrylic rubber, nitrile rubber, hydrogenated nitrile rubber, or ethylene methacrylate terpolymer rubber, or a combination thereof.

14. (Previously Presented) A method according to claim 13, wherein the crosslinked rubber component of the thermoplastic elastomer component has an average particle size of 0.005 to about 25 microns, wherein the thermoplastic elastomer component and thermoplastic polyolefin component are melt blended, and wherein the composition is molded at a temperature from about 260°C to about 371°C.

15. (Previously Presented) A method according to claim 11, wherein said thermoplastic polyolefin component is derived from ethylene, propylene, butene, pentene, hexene, heptene, 2-methyl-1-propene, 3-methyl-1-pentene, 4-methyl-1-pentene, or 5-methyl-1-hexene, or a combination thereof, and wherein said rubber component of the thermoplastic elastomer component is ethylene propylene rubber, EPDM rubber, or a combination thereof.

16. (Previously Presented) A method according to claim 15, wherein the rubber component of the thermoplastic elastomer component is present in an amount from about 40 to about 90 parts by weight per 100 parts by weight of the rubber component and the matrix polymer of the thermoplastic elastomer component, and wherein the rubber component of the thermoplastic component is present in an amount from about 5 to about 50 parts by weight per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin component.

17. (Previously Presented) A method according to claim 16, wherein the rubber component of the thermoplastic elastomer component is present in an amount from about 10 to about 45 parts by weight per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin component.

18. (Previously Presented) A method according to claim 17, wherein the crosslinked rubber component of the thermoplastic elastomer component has an average particle size of from about 0.1 to about 10 microns, wherein the rubber is crosslinked at a temperature of at least 10°C higher than the melt temperature of the matrix polymer of the thermoplastic elastomer component, and wherein blending of the thermoplastic elastomer component and the thermoplastic polyolefin component is conducted at a temperature greater than 10°C above the melting point of the thermoplastic polyolefin component.

19. (Previously Presented) A method according to claim 18, wherein the thermoplastic polyolefin component is polyethylene or polypropylene or a combination thereof, and wherein the matrix polymer of the thermoplastic elastomer component is derived from ethylene, propylene, or 4-methyl-1-pentene, or a combination thereof.

20. (Previously Presented) A method according to claim 19, wherein the toughened polymer composition contains less than 15 parts of oil based on 100 parts by weight of the rubber component of the thermoplastic elastomer component, and wherein the rubber component of the thermoplastic elastomer component is present in an amount from 18 to about 42 parts by weight per 100 parts by weight of the matrix

polymer of the thermoplastic elastomer component and the thermoplastic polyolefin component.

21. (Previously Presented) A toughened thermoplastic composition, comprising:

a blend including a) a thermoplastic polyolefin component, said thermoplastic polyolefin component comprising at least 50% by weight of a homopolymer and b) a thermoplastic elastomer component derived from a rubber component crosslinked in the presence of a matrix polymer, said matrix polymer being a polyolefin, the rubber component being present in an amount from about 2 to about 60 parts per 100 parts by weight of the matrix polymer and the thermoplastic polyolefin component, wherein the toughened polymer composition contains less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, wherein the toughened polymer composition optionally includes a compatibilizer, wherein the toughened thermoplastic composition has a greater impact resistance when compared to either a corresponding composition wherein the rubber component is uncured, or the thermoplastic polyolefin polymer component alone, or a combination thereof, and wherein the toughened thermoplastic composition is substantially free of plasticizer.

22. (Previously Presented) A composition according to claim 21, wherein the thermoplastic polyolefin component is derived from at least one olefin monomer having from 2 to about 14 carbon atoms, wherein the matrix polymer of the thermoplastic elastomer component is derived from at least one olefin monomer having from 2 to 14 carbon atoms, and wherein the rubber component of the thermoplastic elastomer component is derived from at least two different alpha olefin monomers, or is styrene butadiene rubber, hydrogenated styrene butadiene rubber, butyl rubber, butyl-paramethyl styrene copolymer or derivatives thereof, styrenic block copolymer, acrylic rubber, nitrile rubber, hydrogenated nitrile rubber, or ethylene methacrylate terpolymer rubber, or a combination thereof.

23. (Previously Presented) A composition according to claim 22, wherein the crosslinked rubber component of the thermoplastic elastomer component has an

average particle size of about 0.005 to about 25 microns, and wherein the thermoplastic elastomer component and thermoplastic polyolefin component are melt blended.

24. (Previously Presented) A composition according to claim 23, wherein said thermoplastic polyolefin component is derived from ethylene, propylene, butene, pentene, hexene, heptene, 2-methyl-1-propene, 3-methyl-1-pentene, 4-methyl-1-pentene, and 5-methyl-1-hexene, or any combination thereof, and wherein said rubber component of the thermoplastic elastomer component is ethylene propylene rubber, EPDM rubber, or a combination thereof.

25. (Previously Presented) A composition according to claim 24, wherein the rubber component of the thermoplastic elastomer component is present in an amount from about 5 to 50 parts by weight per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin component.

26. (Previously Presented) A composition according to claim 25, wherein the rubber component of the thermoplastic elastomer component is present in an amount from 45 to 70 parts by weight per 100 parts by weight of the rubber component and the matrix polymer of the thermoplastic elastomer component, and wherein the rubber component of the thermoplastic elastomer component is present in an amount from about 10 to about 45 parts by weight per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin component.

27. (Previously Presented) A composition according to claim 26, wherein the crosslinked rubber component of the thermoplastic elastomer component has an average particle size of from about 0.1 to about 10 microns, wherein the rubber is crosslinked at a temperature of at least 10°C higher than the melt temperature of the matrix polymer of the thermoplastic elastomer component, and wherein blending of the thermoplastic elastomer component and thermoplastic polyolefin component is conducted at a temperature greater than 10°C above the melting point of the thermoplastic polyolefin component.

28. (Previously Presented) A composition according to claim 27, wherein the thermoplastic polyolefin component is polyethylene or polypropylene or a combination thereof, and wherein the matrix polymer of the thermoplastic elastomer component is derived from ethylene, propylene, or 4-methyl-1-pentene, or a combination thereof.

29. (Previously Presented) A composition according to claim 28, wherein the toughened polymer composition contains less than 15 parts of oil, based on 100 parts by weight of the rubber component of the thermoplastic elastomer component, and wherein the rubber component of the thermoplastic elastomer component is present in an amount from about 18 to about 42 parts per 100 parts by weight of the matrix polymer of the thermoplastic elastomer component and the thermoplastic polyolefin component.

30. (Previously Presented) A composition according to claim 29, wherein the composition further includes a flame retardant.

31. (Previously Presented) A composition according to claim 21, wherein the composition further includes a flame retardant.

Evidence Appendix

An Affidavit of Fact under 37 CFR §1.132 by co-inventor Raman P. Patel was submitted along with a Request for Continued Examination on April 10, 2006 with the request that the Affidavit and Amendment accompanying the same be entered. The Examiner states that the Affidavit has been considered in the Office Action mailed May 31, 2006. A copy of the Affidavit is attached hereto as Exhibit A.

Related Proceedings Appendix

Not Applicable.

Respectfully submitted,

HUDAK, SHUNK & FARINE CO. L.P.A.

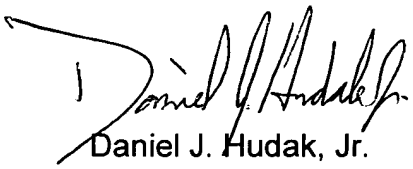

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EXHIBIT A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Raman Patel, et al.	Examiner:	Nathan M. Nutter
Serial No.:	10/754,045	Group Art Unit:	1711
Filed:	01/08/04	Date:	April 10, 2006

For: **TOUGHENED POLYMER COMPOSITIONS**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AFFIDAVIT OF FACT UNDER 37 CFR §1.132

Sir:

I, Raman P. Patel, being duly sworn, hereby state:

THAT I am a co-inventor of U.S. Patent Application Serial No. 10/754,045, filed January 8, 2004, for Toughened Polymer Compositions;

THAT I have received a Bachelor of Science Degree in Chemistry from the Gujarat University in Ahmedabad, India in 1959;

THAT I have received a Masters Degree in Physical Chemistry from the Gujarat University in Ahmedabad, India in 1961;

THAT I have received a Ph.D in Polymer Science from the McGill University in Montreal, Canada in 1968;

THAT I was an employee at Monsanto Chemical Company from 1968 to 1973. I joined Monsanto at their St. Louis location as a Senior Research Chemist. In 1973 I moved to the Akron location and worked until 1996. During my tenure at Monsanto, I was promoted to Research Specialist, then to Senior Research Specialist, then to Fellow, and finally to Senior Fellow;

THAT I have been a Research Fellow from June 1997 to present at The Teknor Apex Company, Assignee of the above-identified U.S. application;

THAT I am the inventor or a co-inventor of approximately 63 U.S. Patents;

THAT I have read the Office Action for the above-identified application having a mailing date of January 9, 2006 prepared by Examiner Nutter;

THAT I have read the cited references, namely Coran et al. U.S. Patent No. 4,104,210 (the Coran '210 reference), the Coran et al. U.S. Patent No. 4,141,878 (the Coran '878 reference), and the Coran et al. U.S. Patent No. 4,130,535 (the Coran '535 reference), of which I am a co-inventor;

THAT the Coran '210 reference teaches thermoplastic elastomeric compositions which comprise about 25-45 parts by weight of polyolefin resin and about 77-55 parts by weight of vulcanized high unsaturation diene rubber as set forth in column 1, lines 40-46;

THAT the Coran '210 reference, of which I am a co-inventor, teaches and suggests that when the quantity of rubber falls below about 55 parts by weight per 100 parts by weight of thermoplastic resin and rubber combined, wherein the thermoplastic resin would necessarily include any post-vulcanization added thermoplastic resin as described in column 7, lines 8-21, that hard, rigid compositions having reduced toughness are obtained;

THAT according to the teachings of the Coran '210 reference, one of ordinary skill in the art would not be led in the direction taken by the Applicant to provide a toughened polymer composition by using relatively low amounts of rubber on the order of less than 37.5 parts of rubber based on 100 parts by weight of resin and rubber combined, as it is suggested in the '210 reference and noted by the Examiner on page 5, second and third to last line of the Office Action, that products of the instant claims according to the Coran '210 reference would thus have "reduced toughness". Instead, unexpectedly, toughened polymer compositions having improved impact resistance properties are produced, and it would not be obvious to prepare such toughened compositions based on the Coran '210 teachings;

THAT the Coran '210 reference in column 6, lines 57-63, teaches the use of extender oil in the thermoplastic elastomer composition;

THAT as known to one of ordinary skill in the art, extender oil provides greater elasticity to a thermoplastic elastomer and there is no teaching or suggestion within

the Coran '210 reference to provide a composition and methods for preparing a composition containing less than the claimed 20 parts by weight of oil per 100 parts by weight of rubber along with other claimed features which exhibit toughness as evidenced by improved impact resistance;

THAT the Coran '535 reference teaches preparing thermoplastic elastomers (vulcanizates) that can be utilized to prepare a variety of articles by extrusion, injection molding, and compression molding techniques. The Coran '535 reference further teaches that the vulcanizates are blended with thermoplastic resins wherein it is vaguely stated that the properties of the modified resin depend upon the amount of vulcanizate blended.

THAT the Coran '535 reference, of which I am a co-inventor, provides no teaching or suggestion for modifying a thermoplastic resin to produce a toughened polymer composition as claimed having the specifically claimed features and less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, and that one of ordinary skill in the art would not expect the claimed compositions to produce toughened polymer compositions, as one of ordinary skill in the art believes that adding more oil would soften the composition and thereby improve the impact resistance, whereas the contrary has been found unexpectedly to be true by the Applicants.

THAT the Coran '878 reference teaches thermoplastic elastomers of CSM rubber and polyolefin, and as stated in column 2, lines 32-38, "When the quantity of cross-linked CSM rubber, in the absence of plasticizer falls below about 50 parts by weight per 100 parts total weight of polyolefin resin and CSM rubber, or when the quantity of polyolefin resin exceeds 50 weight percent of the composition, hard, rigid compositions having reduced toughness are obtained." The teaching is relevant to whether the polyolefin resin is a matrix polymer and/or a thermoplastic polymer component.

THAT products of the instant claims according to the teachings of the Coran '878 reference, of which I am a co-inventor, would be believed to have "reduced toughness" and would not be obvious to prepare the claimed methods and

compositions, which therefore, unexpectedly, are toughened polymer compositions having improved impact resistance properties, and it would not be obvious to try to prepare such compositions based on the Coran '878 teachings;

THAT claims 11 and 13-20 teach a method for producing rotationally molded articles having toughness, including the specific limitations as set forth therein;

THAT the Coran '210 reference in column 4, lines 1-5, teaches that the thermoplastic elastomeric compositions are further processable by extrusion or injection molding and column 7, lines 11-13, further teaches making articles by compression molding techniques.

THAT the Coran '535 reference teaches making articles by extrusion, injection molding and compression molding techniques, see column 6, lines 44-46;

THAT the Coran '878 reference teaches articles may be formed from thermoplastic elastomers by extrusion, injection molding or compression molding, see column 1, lines 17-19, as well as column 6, lines 28-40;

THAT there is no teaching or suggestion within my own references, namely, the Coran '210, '535 and '878 references, of a method for producing rotational molded articles having toughness as claimed in claims 11 and 13-20.

THAT as known to one of ordinary skill in the art, rotational molding is substantially different than injection molding, compression molding and extrusion and presents different variables and challenges than extrusion, injection molding and compression molding;

THAT during rotational molding, compositions to be molded are subjected to relatively high temperatures for extended periods of time as compared to the other forms of molding, namely, extrusion, injection molding and compression molding;

THAT it is known to the art that cured and uncured rubber containing compositions are not suitable for producing rotational molded articles as the rubber is not stable during the extended period of molding time utilized in producing rotational molded articles. Further, uniform melt flow during rotational molding is a problem when utilizing rubber containing compositions;

THAT it has been unexpectedly found that the toughened polymer compositions of the present invention, including the cross-linked rubber component as claimed unexpectedly produce, according to the rotational molding method of the present invention, parts having high surface quality with excellent hardness and impact strength;

THAT according to the Coran '210, '535 and '878 references, of which I am a co-inventor, one of ordinary skill in the art would not be led in the direction taken by the Applicants in order to arrive at the claimed method for producing rotationally molded articles;

THAT in view of the above statements, Applicants' invention is readily distinguished from the Coran '210, '535 and '878 references.

Date: April 06, 2006

Raman P. Patel

STATE OF RHODE ISLAND)
)
COUNTY OF Providence)

Before me, a Notary Public in and for said County and State, personally appeared Raman Patel, who acknowledged that he executed the foregoing instrument as his own free act and deed.

In witness whereof, I have hereunto set my hand and seal this 6 day of April 2006.

Notary Public

SEAL